- Benign prostatic hyperplasia
- Microhematuria
- Small renal masses

…Updates on common urologic problems

John Gunselman, DO
Urologic Oncologist
Providence Urology Clinic East
Providence Portland Medical Center
Portland, OR

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Disclosures / Conflicts of interest

- None

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Objectives

- Basic evaluation and treatment of benign prostatic hyperplasia and lower urinary tract symptoms. Familiarization with current medical and procedural treatments. (25 min)
- Review etiologies of hematuria and risk stratification methods for further evaluation. (5 min)
- Review current management of small renal masses and understand which warrant further evaluation/treatment vs. surveillance. (5 min)

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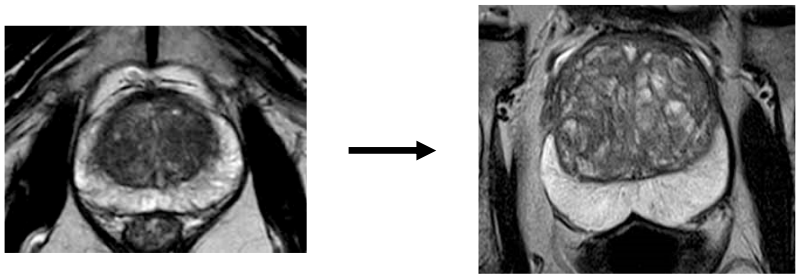
Benign prostatic hyperplasia



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Definitions / Pathophysiology

Benign prostatic hyperplasia (BPH)

- Histologic: proliferation of smooth muscle and epithelial cells in the transition zone of the prostate

Benign prostatic enlargement (BPE)

- Anatomic: Enlargement due to BPH

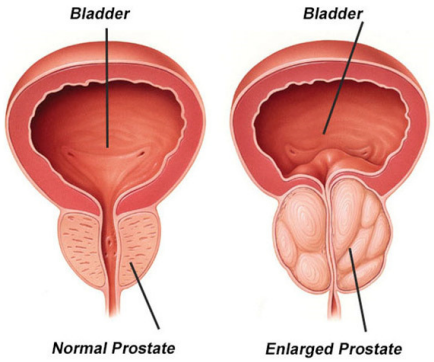
Benign prostatic obstruction (BPO)

- Pathophysiologic: Compression of urethra —> compromise of urinary flow —> obstruction of the bladder

Lower urinary tract symptoms (LUTS) - generalized term used when etiology is unclear or multifactorial

Although often used interchangeably,

BPH ≠ BPE ≠ BPO ≠ LUTS



* Roehrborn, C.: Benign Prostatic Hyperplasia: Etiology, Pathophysiology, Epidemiology, and Natural History. Campbell-Walsh Urology, vol. 3, pp. 2570-2610, 2011

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Causes of lower urinary tract symptoms

Benign prostatic obstruction often leads to or coexists with detrusor overactivity ("overactive bladder") given physiologic effects outlet obstruction has on the bladder function.

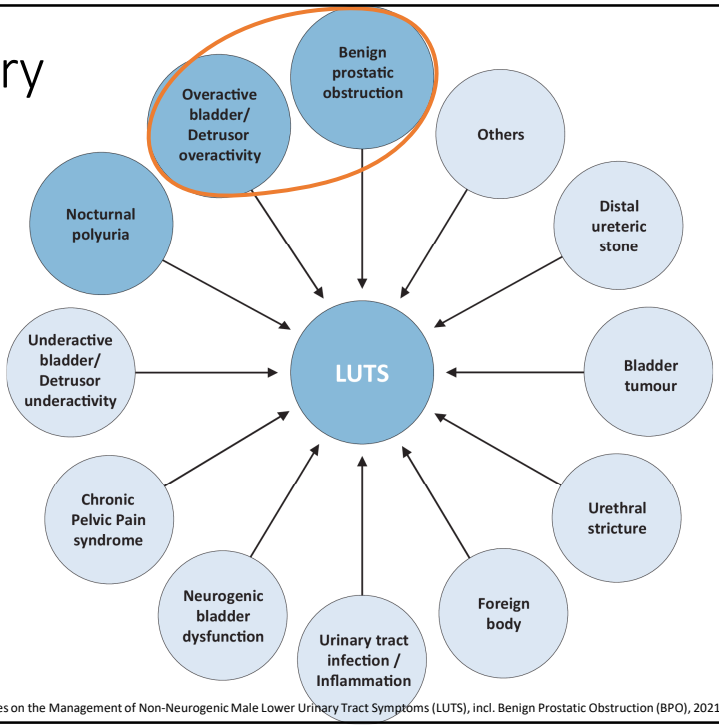

Diagram credit: EAU Guidelines on the Management of Non-Neurogenic Male Lower Urinary Tract Symptoms (LUTS), incl. Benign Prostatic Obstruction (BPO), 2021.

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Diagnosis / Evaluation

Evaluation of patients presenting with LUTS suggestive of benign prostatic hyperplasia

- Medical history
- Review medication and lifestyle habits
- Discuss emotional and psychological factors
- Physical exam including digital rectal exam (DRE) and focused neurologic examination
- Urinalysis to screen for hematuria and UTI
- PSA testing
  - In patients with anticipated longevity > 10 years*
  - If known presence of prostate cancer would change management

*Carter HB, Albertsen PC, Barry MJ, Etzioni R, Freedland SJ, Greene KL, Holmberg L, Kantoff P, Konety BR, Murad MH, Penson DF, Zietman AL. Early detection of prostate cancer: AUA Guideline. J Urol. 2013 Aug;190(2):419-26.

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International Prostate Symptom Score (I-PSS)

Patient Name: Date:	Not at all	Less than 1 time in 5	Less than half the time	About half the time	More than half the time	Almost always	YOUR SCORE
1. Incomplete Emptying Over the past month, how often have you had a sensation of not emptying your bladder completely after you finish urinating?	0	1	2	3	4	5	
2. Frequency Over the past month, how often have you had to urinate again less than two hours after you have finished urinating?	0	1	2	3	4	5	
3. Intermittency Over the past month, how often have you found you stopped and started again several times when you urinated?	0	1	2	3	4	5	
4. Urgency Over the past month, how often have you found it difficult to postpone urination?	0	1	2	3	4	5	
5. Weak Stream Over the last month, how often have you had a weak urinary stream?	0	1	2	3	4	5	
6. Straining Over the past month, how often have you had to push or strain to begin urination?	0	1	2	3	4	5	
	None	Once	Twice	3 times	4 times	5 or more	YOUR SCORE
7. Nocturia Over the past month how many times did you most typically get up each night to urinate from the time you went to bed until the time you got up in the morning?	0	1	2	3	4	5	
Total I-PSS Score							

Quality of Life due to Urinary Symptoms	Delighted	Pleased	Mostly satisfied	Mixed	Mostly unhappy	Unhappy	Terrible
If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about that?	0	1	2	3	4	5	6

The I-PSS is based on the answers to seven questions concerning urinary symptoms. Each question is assigned points from 0 to 5 indicating increasing severity of the particular symptom. The total score can therefore range from 0 to 35 (asymptomatic to very symptomatic).

Although there are presently no standard recommendations into grading patients with mild, moderate or severe symptoms, patients can be tentatively classified as follows: **0 - 7 = mildly symptomatic; 8 - 19 = moderately symptomatic; 20 - 35 = severely symptomatic.**

The International Consensus Committee (ICC) recommends the use of only a single question to assess the patient's quality of life. The answers to this question range from "delighted" to "terrible" or 0 to 6. Although this single question may or may not capture the global impact of BPH symptoms on quality of life, it may serve as a valuable starting point for doctor-patient conversation.

Score = 0 (best) to 35 (worst) with a QOL score 0-6
0-7 mildly symptomatic
8-19 moderately symptomatic
20-35 severely symptomatic

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Diagnosis / Evaluation

Selective evaluation of patients presenting with LUTS suggestive of BPO

- Frequency-voiding chart / Voiding diary
- Post-void residual measurement
- Cystoscopy
- Trans-rectal ultrasound of the prostate
- Urodynamics with Pressure/flow studies for complex presentations
- Renal ultrasound (only in cases of very elevated PVR)

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Treatments

- Behavioral
- Herbal
- Medical
- Surgical

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BPO Treatments: Medical

- Alpha (α1)-blockers
- 5-α-reductase inhibitors (5-ARI)
- Anticholinergics
- Beta-3 agonists
- Phosphodiesterase inhibitors, type 5 (PDE-5i)
- Combination therapy

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BPO Treatment: Alpha-1 blockers

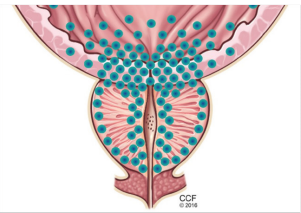

Photo credit: Cleveland Clinic Foundation

- Mechanism: relax smooth muscle at the bladder neck and prostate
- Most common initial therapy for treating LUTS/BPH.
- Classes
  - Second generation agents (terazosin, doxazosin) need to be titrated to effect.
  - Alpha 1_a-selective blockers (tamsulosin, alfuzosin, silodosin) were developed to avoid the systemic side effects associated with α-blockade.
- Outcomes
  - Improvements in flow rate from 0.59-4.8ml/s. (Normal flow rate >20 ml/s)
  - Symptom score reductions range from 1-4.2 points
  - **All have similar efficacy in appropriate doses**.
  - α1-blockers do not prevent occurrence of urinary retention or need for surgery.

Kirby, R. S., Lepor, H.: Evaluation and nonsurgical management of benign prostatic hyperplasia. In: Campbell-Walsh Urology. Edited by A. Wein
Bilal Chughtai, MD, et al. AUA Core Curriculum: Medical BPH. Accessed: https://university.auanet.org/core/BPH/medical-bph/index.cfm Updated 1/21/21.
van Dijk, M.M., et al. Effects of alpha(1)-adrenoceptor antagonists on male sexual function. Drugs, 2006. 66: 287.

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Treatment: Alpha-blockers

- Adverse Effects:
  - Most common: decline in blood pressure that can result in **dizziness** (5-15% with $\alpha 1_a$-selective agents), **retrograde ejaculation** (6%), and rhinitis (12%).[1] CV effects are dose and alpha-selectivity dependent.
  - α-blockers, particularly tamsulosin, have been associated with intra-operative floppy iris syndrome (IFIS) (incidence 0.9-3.7%) [2] This problem leads to higher rates of iris trauma and posterior capsule rupture during cataract surgery. IFIS is associated with any prior use of α-blockers.
  - α-blockers (particularly non-selective) and 5-ARI linked to small but statistically significant increase risk of CHF in populations studies (HR 1.22; 95% CI 1.18-1.26 for alpha-blocker alone).[3] Findings previously observed in ALLHAT and REDUCE trials.[4,5]
- α-blockers do not adversely affect libido, have a small beneficial effect on erectile function, but can cause abnormal ejaculation.[6]
- A single observational study in 2018 found that tamsulosin use may increases long-term risk of dementia. Subsequent observational studies to date have contradicted this. [7,8]

1 Lepor, H. Phase III Multicenter Placebo-Controlled Study of Tamsulosin in Benign Prostatic Hyperplasia. Urology, 1998. 51; 6: 892-900.
2 Chatziralli, I, Sergentanis, T. Risk Factors for Intraoperative Floppy Iris Syndrome: A Meta-Analysis. Ophthalmology, 2011. 188; 4: 730-735
3Lusty A, et al. Cardiac Failure Associated with Medical Therapy of Benign Prostatic Hyperplasia: A Population Based Study. J Urol. 2021 May;205(5):1430-1437.
4 Andriole GL, et al: Effect of dutasteride on the risk of prostate cancer. N Engl J Med 2010; 362: 1192.
5 The ALLHAT Officers. Major outcomes in high-risk hypertensive patients randomized to angiotensin-converting enzyme inhibitor or calcium channel blocker vs diuretic. JAMA 2002 288: 2981
6 Gacci, M., et al. Impact of medical treatments for male lower urinary tract symptoms due to benign prostatic hyperplasia on ejaculatory function: a syst review and meta-analysis. J Sex Med, 2014. 11: 1554.
7 Tae BS, et al. α-Blocker and Risk of Dementia in Patients with Benign Prostatic Hyperplasia: A Nationwide Population Based Study Using the NHI Service Database. J Urol. 2019 Aug;202(2):362-368.
8 Frankel JK, Duan Y, Albertsen PC. Is Tamsulosin Linked to Dementia in the Elderly? Curr Urol Rep. 2018 Jul 3;19(9):69

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Treatment: 5-alpha-reductase inhibitors

- Drugs:
  - finasteride (Proscar®)
  - dutasteride (Avodart®)
- Mechanism:
  - 5-ARIs block the conversion of testosterone to dihydrotestosterone (DHT) → reduction in prostate volume and decrease in symptoms associated with BPO.
- Outcomes:
  - **57%** risk reduction in urinary retention and **55%** risk reduction in the need for BPH-related surgery over 4 years.
  - Mean increase in flow rate **1.5-2.2ml/s**
  - Reduction in symptom scores ranging from **0.8-4.5**
  - Reduced prostate volume **15-32%.**

McConnell J, et al. The Effect of Finasteride on the Risk of Acute Urinary Retention and the Need for Surgical Treatment among Men with Benign Prostatic Hyperplasia. N Engl J Med 1998; 338:557-563
Bilal Chughtai, MD, et al. AUA Core Curriculum: Medical BPH. Accessed: https://university.auanet.org/core/BPH/medical-bph/index.cfm Updated 1/21/21.

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Treatment: 5-alpha-reductase inhibitors

- Adverse Effects:
  - **Decreased libido** (6.4%)
  - **Erectile dysfunction** (8.1%),
  - Ejaculatory disorder (0.8%)
  - Gynecomastia (0.5%) / breast tenderness (0.4%)
- Additional points:
  - Indicated for:
    - Moderate to severe LUTS
    - Patients with prostate volume > 30 ml; **most beneficial when >40 ml**
  - **50% drop in PSA** with 9-12 months' use of 5-ARI. **Caution when interpreting "normal levels".**
  - Counsel patients on **slow onset of action**: 3-6 months.

McConnell J, et al. The Effect of Finasteride on the Risk of Acute Urinary Retention and the Need for Surgical Treatment among Men with Benign Prostatic Hyperplasia. N Engl J Med 1998; 338:557-563

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Treatment: PDE-5 inhibitor

- Mechanism:
  - Phosphodiesterase inhibitor, type 5, with cross-reactivity of other types found in prostate causes a vasodilation effect, however the mechanism leading to improvement in urinary symptoms is unknown.
- Outcomes:
  - Improvements in LUTS observed with use of **sildenafil, tadalafil, and vardenifil**
  - Mean increase in flow rate **0-2.4ml/s**
  - Reduction in symptom scores ranging from **1.4-4.6 points**
- Adverse Effects:
  - Headache (15%), dyspepsia (4-10%), and flushing (3-11%) - dose dependent relationship
  - Contraindicated in NYHA class 3+ CHF
- Additional points:
  - Only tadalafil has FDA approval for BPO/LUTS at 5 mg daily dosing.
  - Generic status makes this an option for more patients

Bilal Chughtai, MD, et al. AUA Core Curriculum: Medical BPH. Accessed: https://university.auanet.org/core/BPH/medical-bph/index.cfm Updated 1/21/21.

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Treatment: Anticholinergics

- Drugs: oxybutynin, tolterodine, fesoterodine, trospium, darifenacin, solifenacin
- Mechanism: Anticholinergics block the acetylcholine signal at the neuromuscular junctions of the detrusor muscle —> inhibition of detrusor contractions
- Rationale: Minimize LUTS from detrusor overactivity occurring with or independently of BPH
- Outcome
  - Addition of anticholinergics to therapy for BPH **improved symptom scores by 6-8.5** with mixed effects on flow and post-void residual
  - Low acute urinary retention rate of **0.3%** at 12 weeks of follow-up.
- Adverse Effects:
  - Dry mouth (20-71%), constipation (10-21%), blurry vision (5%), dizziness (up to 16%)
  - **Cognitive effects** (highest: oxybutynin, lowest: darifenacin and trospium)
- Additional considerations:
  - Not all antimuscarinics have been tested in elderly men, and long-term studies on the efficacy of anticholinergics in men of any age with LUTS are not yet available.
  - Relative contraindication when post-void residual **> 150 ml**

Bilal Chughtai, MD, et al. AUA Core Curriculum: Medical BPH. Accessed: https://university.auanet.org/core/BPH/medical-bph/index.cfm Updated 1/21/21.
Blake-James BT, Rashidian A, Ikeda Y, et al. The role of anticholinergics in men with lower urinary tract symptoms suggestive of benign prostatic hyperplasia: a systematic review and meta-analysis. 2007
Chancellor M, Boone T. Anticholinergics for overactive bladder therapy: central nervous system effects. *CNS Neurosci Ther*. 2012;18(2):167-174. doi:10.1111/j.1755-5949.2011.00248.

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Treatment: Beta-3 agonists

- Drugs:
  - Mirabegron (Myrbetriq®)
  - Vibegron (Gemtesa®)
- Mechanism:
  - Beta-3 is the predominant beta receptors expressed in the smooth muscle cells of the detrusor and their stimulation is thought to induce detrusor relaxation.
- Outcome
  - Systematic review demonstrates mirabegron significantly reduced nocturia episodes, incontinence episodes and mean number of micturitions compared to placebo and tolterodine
  - Similar treatment-emergent adverse event rates as placebo.
- Adverse Effects (rare):
  - Hypertension, UTI, headache, nasopharyngitis

Bilal Chughtai, MD, et al. AUA Core Curriculum: Medical BPH. Accessed: https://university.auanet.org/core/BPH/medical-bph/index.cfm Updated 1/21/21.
EAU Guidelines on the Management of Non-Neurogenic Male Lower Urinary Tract Symptoms (LUTS), incl. Benign Prostatic Obstruction (BPO), 2021.
Sebastianelli A, et al. Systematic review and meta-analysis on the efficacy and tolerability of mirabegron for the treatment of storage lower urinary tract symptoms/overactive bladder: Comparison with placebo and tolterodine. Int J Urol. 2018 Mar;25(3):196-205.

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Treatment: Combination therapy

- Combinations of α1-blockers and 5-ARI drugs have been extensively studied
  - Combination therapy demonstrated the greatest risk reduction (**66%)** in clinical progression of LUTS/BPH, acute urinary retention, renal insufficiency, recurrent urinary tract infection, and urinary incontinence.
- Combination therapy with α1-blocker and anticholinergic vs beta-3 agonist also supported in RCTs
- Low-dose daily 5mg tadalafil with alpha blockers for the treatment of LUTS/BPO offers no advantages in symptom improvement over either agent alone.

Bilal Chughtai, MD, et al. AUA Core Curriculum: Medical BPH. Accessed: https://university.auanet.org/core/BPH/medical-bph/index.cfm Updated 1/21/21.
McConnell, J. D., Roehrborn, C. G., Bautista, O. M. et al.: The long-term effect of doxazosin, finasteride, and combination therapy on the clinical progression of benign prostatic hyperplasia. N Engl J Med, 349: 2387, 2003 The MTOPS study represents the largest combination therapy trial and underpins the use of 5ARI and α-blockers for medical treatment.
Kirby, R. S., Roehrborn, C., Boyle, P. et al.: Efficacy and tolerability of doxazosin and finasteride, alone or in combination, in treatment of symptomatic benign prostatic hyperplasia: the Prospective European Doxazosin and Combination Therapy (PREDICT) trial. Urology, 61: 119, 2003
Lepor, H., Williford, W. O., Barry, M. J. et al.: The efficacy of terazosin, finasteride, or both in benign prostatic hyperplasia. Veterans Affairs Cooperative Studies Benign Prostatic Hyperplasia Study Group. N Engl J Med, 335: 533, 1996
Kaplan, S. A., Roehrborn, C. G., Rovner, E. S. et al.: Tolterodine and tamsulosin for treatment of men with lower urinary tract symptoms and overactive bladder: a randomized controlled trial. JAMA, **296:** 2319, 2006+

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Anecdotal comments

- If you don't ask about it, many men will not tell you it's a problem.
- Common ≠ normal
- Isolated nocturia → Think about OSA!
- Healthy young (<40 y/o) male with moderate/severe LUTS and no s/s of infection → consider pelvic floor dysfunction (Rx: pelvic floor physical therapy)

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Treatments: Surgical

Indications:

- BPO/LUTS refractory to medical therapy OR a desired surgical alternative
- Urinary retention due to BPO
- Recurrent UTI or urosepsis
- Recurrent gross hematuria or bladder calculi due to BPO
- Renal insufficiency secondary to BPO

Source: AUA Guidelines: Management of Benign Prostatic Hyperplasia. https://www.auanet.org/guidelines/guidelines/benign-prostatic-hyperplasia-(BPH)-guideline

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Treatments: Surgical: Options…

TURP

UROLIFT®
BPH Relief. In Sight.™

HoLEP

rezūm®
THE NEW WAVE IN BPH TREATMENT

AQUABEAM®
ROBOTIC SYSTEM

Simple prostatectomy

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Treatments: Surgical

Transurethral procedures

- Ablative / extirpative therapies
  - TURP
  - Laser therapies – thulium, holmium, KTP lasers: ablative and laser enucleation techniques (AKA HoLEP or ThuLEP)
  - Aquablation
- Minimally invasive surgical therapies **(MIST)**
  - Transurethral needle abalation (TUNA) of the prostate - no longer recommended
  - Transurethral microwave thermotherapy (TUMT) – lack of efficacy – obsolete
  - Prostatic urethral lift (UroLift ®)
  - Convective Water Vapor Therapy (Rezum ®)
  - Prostatic stents (iTind)
  - Intra-prostatic injection – multiple agents currently under investigation

Simple prostatectomy (open, laparoscopic, robotic)

Prostatic arterial embolization – not recommended

Source: AUA Guidelines: Management of Benign Prostatic Hyperplasia.
https://www.auanet.org/guidelines/guidelines/benign-prostatic-hyperplasia-(BPH)-guideline

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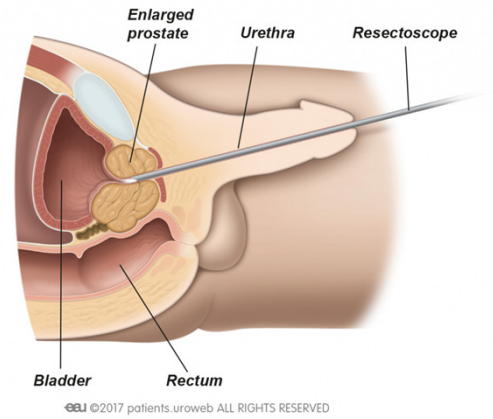
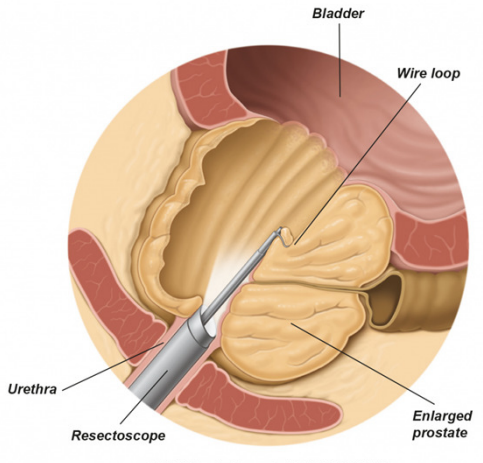
Treatments: Transurethral resection of the prostate

An electro-cautery loop is used to resect redundant prostatic tissue creating a wider urethral channel.





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Treatments: TURP

Advantages

- Gold standard treatment for BPH with established durability and safety
- Best improvements in validated QOL metrics: Change in flow (10-18 ml/s), symptom score (14 points)
- Most durable results as shown by studies with a follow-up of 8-22 years
- Lowest re-operation rate: 3-8%

Disadvantages:

- Sexual dysfunction (ejaculatory - 60%, ED - rare)
- Urethral stricture / bladder neck contracture risk ~0-4% risk
- Incontinence - 10%, but usually urge-related and self-limited
- Postop catheterization (1-7 days)
- Post-procedural symptoms 2-6 weeks (dysuria, urgency, frequency, hematuria, urge incontinence)
- Blood loss (avg 0.6-1.6g/dL) and urinary clot retention (4-5%) (reduced since advent of bipolar TURP in 2001)

European Association Guidelines on management of Non-Neurogenic male Lower Urinary Tract Symptoms (LUTS), including Benign Prostatic Obstruction (BPO). Accessed: https://uroweb.org/wp-content/uploads/EAU-Guidelines-on-Non-Neurogenic-Male-LUTS-incl.-BPO-2020.pdf, 10/2021
Bilal Chughtai, MD, et al. AUA Core Curriculum: Medical BPH. Accessed: https://university.auanet.org/core/BPH/medical-bph/index.cfm Updated 1/21/21.
Bipolar versus monopolar transurethral resection of the prostate: a systematic review and meta-analysis of randomized controlled trials. Eur Urol. 2009 Nov;56(5):798-809.

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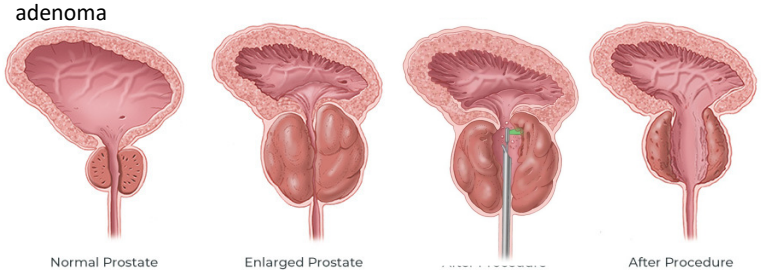
Treatments: Laser Prostatectomy

Laser is used to…

… ablate or vaporize the prostate adenoma

OR

… enucleate the prostate adenoma



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Treatments: Laser prostatectomy or enucleation

Advantages

- Most RCTs show comparable efficacy to TURP. The enucleation approach may be superior to TURP for very large prostates (>80 ml)
- May be superior for patients on anticoagulation

Disadvantages:

- Average operative time slower compared to TURP
- Similar side-effect profile and recovery period to TURP with regard to post-procedural LUTS
- The enucleation technique has a very steep learning curve - few urologists perform this approach.

European Association Guidelines on management of Non-Neurogenic male Lower Urinary Tract Symptoms (LUTS), including Benign Prostatic Obstruction (BPO). Accessed: https://uroweb.org/wp-content/uploads/EAU-Guidelines-on-Non-Neurogenic-Male-LUTS-incl.-BPO-2020.pdf, 10/2021

Bilal Chughtai, MD, et al. AUA Core Curriculum: Medical BPH. Accessed: https://university.auanet.org/core/BPH/medical-bph/index.cfm Updated 1/21/21.

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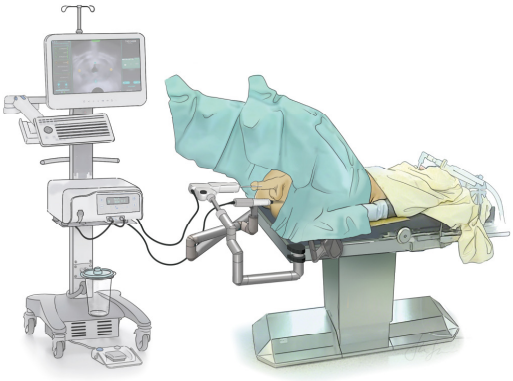
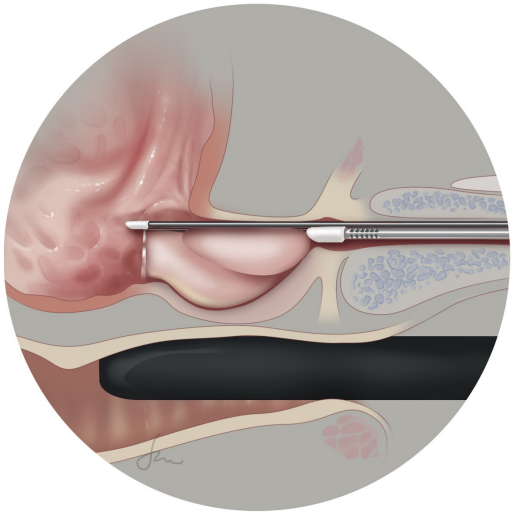
Treatments: Image-guided robotic waterjet ablation (Aquablation)



Eur Urol. 2019 Nov;76(5):667-675.



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Treatments: Aquablation

Advantages

- Similar outcomes to TURP with lower risk of anejaculation
- Theoretically a faster, more consistent procedure.

Disadvantages:

- Similar to TURP with regard to postop catheterization, healing period, blood loss
- Healing period 2-6 weeks (dysuria, urgency, frequency, hematuria, urge incontinence)
- Requires general anesthesia
- Limitations with prostate size, but not shape
- Limited availability - expensive capital investment

Gilling P, Barner N, Bidair M, et al. WATER: A double-blind, randomized controlled trial of aquablation vs. transurethral resection of the prostate in benign prostatic hyperplasia. J Urol 2018;199:1252-61.

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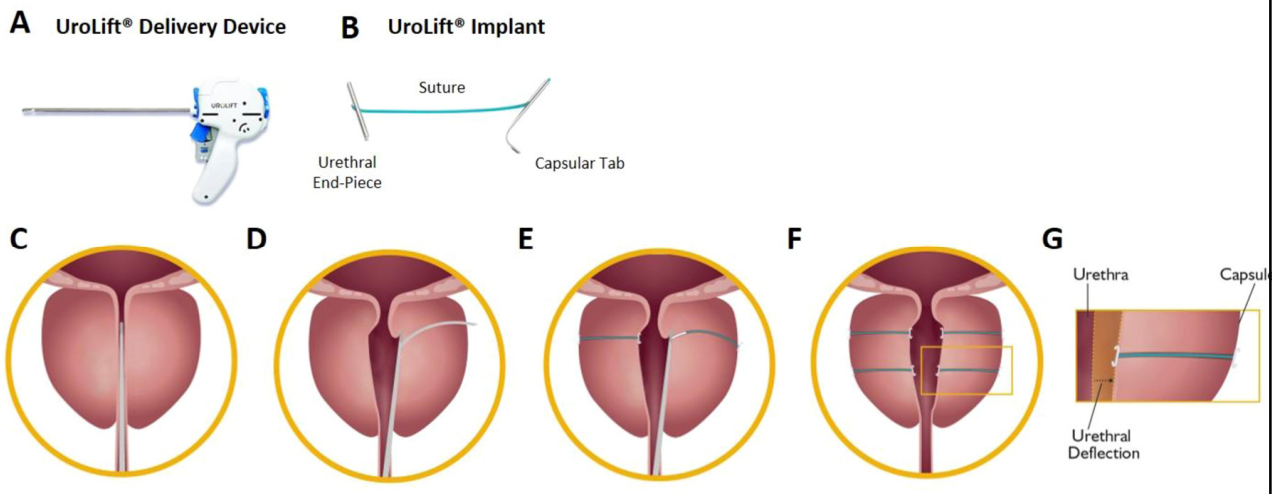
Treatments: Prostate urethral lift (Urolift®)



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Treatments: Urolift

Advantages

- Mean improvement symptom score - 52%, QOL - 53%, Flow rate - 51% - at 12-months
- Office-based procedural option
- Post-procedural symptom relief within 2 weeks
- No loss of sexual function
- Most patients require no post-procedural catheterization

Disadvantages:

- Inferior results to TURP (Avg IPSS reduction of 11 vs 14)
- Limitations with regard to prostate size/shape
- Not indicated for patients in urinary retention
- Permanent implant – rare risk of misplaced implants requiring re-operation or TURP
- 6.5% progress to TURP in 1 year, 13.6% in 5 years
- Large comparative trials with long-term data lacking

McNicholas TA, Woo HH, Chin PT, Bolton D, Fernández Arjona M, Sievert KD, Schoenthaler M, Wetterauer U, Vrijhof EJ, Gange S, Montorsi F. Minimally invasive prostatic urethral lift: surgical technique and multinational experience. Eur Urol. 2013

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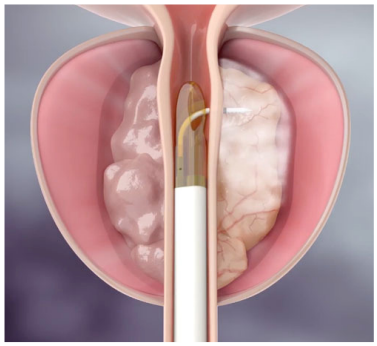
Treatments: Convective water vapor therapy (Rezum®)



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Treatments: Convective water vapor therapy (Rezum®)

Advantages

- Mean improvement IPSS - 11 points, flow rate 6.2 ml/s throughout 12 months
- Office-based procedure
- No loss of sexual function
- Can treat median lobes
- 4.4% re-intervention in 4 years

Disadvantages:

- Inferior results to TURP (Avg IPSS reduction of 11 vs 14)
- Post-procedural catheterization necessary
- Similar recovery period to TURP with regard to post-procedural LUTS
- Large comparative trials with long-term data lacking

Roehrborn,et al.: Convective Thermal Therapy: Durable 2-Year Results of Randomized Controlled and Prospective Crossover Studies for Treatment of Lower Urinary Tract Symptoms Due to Benign Prostatic Hyperplasia. J Urol. 197(6):1507-1516, 2017

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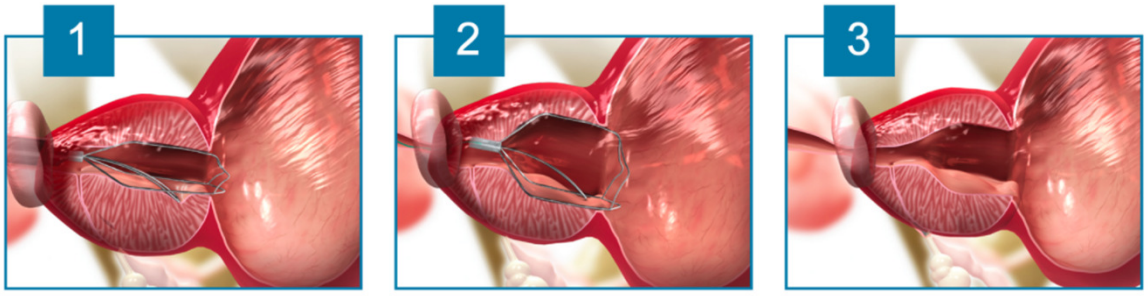
Treatments: Prostate stents (iTind®)



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Treatments: iTind (temporarily implantable nitinol device)

Advantages

- Mean improvement IPSS - 12 points, Flow rate - 8.4 ml/s at 3 months
- Office-based procedure
- Post-procedural symptom relief within 1 weeks
- No loss of sexual function
- No post-procedural catheterization

Disadvantages:

- Newer device with short term data (3 years)
- Inferior results to TURP (Avg IPSS reduction of 12 vs 14)
- Limitations with regard to prostate size/shape
- Not indicated for patients in urinary retention
- Large comparative trials with long-term data lacking

Kadner G, Valerio M, Giannakis I, Manit A, Lumen N, Ho BSH, Alonso S, Schulman C, Barber N, Amparore D, Porpiglia F. Second generation of temporary implantable nitinol device (iTind) in men with LUTS: 2 year results of the MT-02-study. World J Urol. 2020 Dec;38(12):3235-3244.

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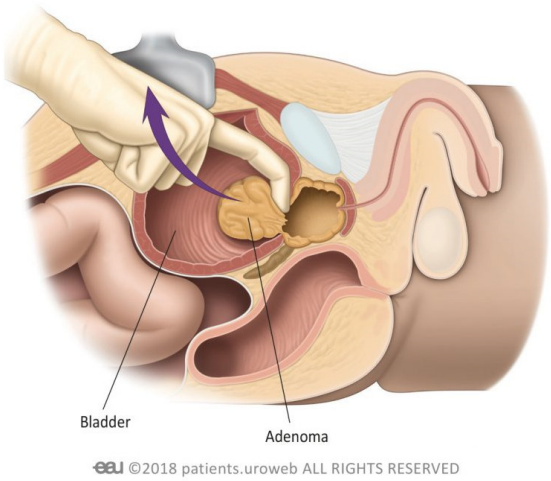
Treatments: Simple prostatectomy



- Appropriate alternative for patients in whom transurethral procedures are not feasible due to prostate size
- Reserved for prostates larger than 80ml and/or in patients with large bladder diverticula or bladder stones requiring concomitant procedures
- Simple prostatectomy involves enucleation of the gland with the capsule
- The procedure can be performed open, laparoscopically, or robotically

McVary K, et al. Update on AUA Guideline on the Management of Benign Prostatic Hyperplasia. 2011. *J Urol*: 185: 5; 1793-1803.

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Least invasive ⟷ Most invasive

	iTind ®	Urolift ®	Rezum ®	Laser vaporization	Aquablation	Laser enucleation	TURP	Simple Prostatectomy
Small / Med Prostate (30-80 mL)	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊖
Large prostate (>80 mL)	⊖	⊖	⊖	⊖	⊖	⊕	⊕/⊖	⊕
Median lobe	⊖	⊖	⊕/⊖	⊕	⊕	⊕	⊕	⊕
Int'l Prostate Symptom Score	⊕	⊕	⊕	⊕⊕	⊕⊕	⊕⊕	⊕⊕	⊕⊕
Ejaculation Preservation	⊕	⊕	⊕	⊖	⊕	⊖	⊖	⊖
Recovery	⊕	⊕	⊖	⊖	⊖	⊖	⊖	⊖⊖
Anticoagulation	⊕	⊖	⊖	⊕	⊖	⊕/⊖	⊖	⊖
Complication rate	⊕	⊕	⊕	⊖	⊖	⊖	⊖	⊖
Reintervention Rate	?	⊕/⊖	?	⊕	⊕	⊕	⊕	⊕
Availability	⊕	⊕	⊕	⊕	⊖	⊖	⊕	⊕

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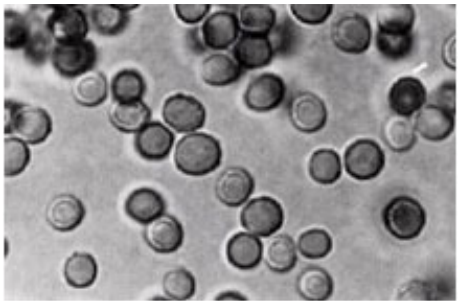
Microhematuria (asymptomatic)



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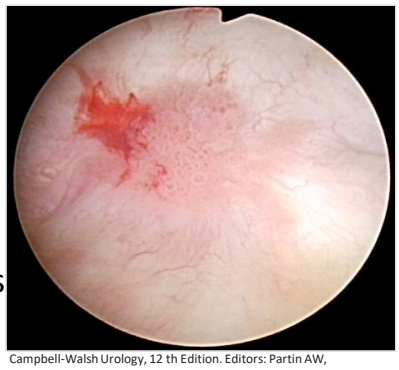
Microhematuria: Relevance



Campbell-Walsh Urology, 12 th Edition. Editors: Partin AW, Peters CA, Kavoussi LR, Dmochowski RR, Wein AJ. 2020.

- Kidney & bladder cancer ~ 138,000 cases annually[1]
- Practice-pattern assessments have demonstrated significant deficiencies in the evaluation of patients presenting with hematuria.[2]
- Cystoscopy and imaging occur in < 20% of patients in most series; varies by sex and race.[2]
- Delays in diagnosis of bladder cancer have been suggested to contribute to a 34% increased risk of cancer-specific mortality and a 15% increased risk of all-cause mortality. [3]

1 CDC: U.S. Cancer Statistics: Highlights from 2018 Incidence (Accessed at www.cdc.gov)
2 Barocas DA, et al. Microhematuria: AUA/SUFU Guideline. J Urol. 2020 Oct;204(4):778-786.
3 Hollenbeck BK, Dunn RL, Ye Z et al: Delays in diagnosis and bladder cancer mortality. Cancer 2010; 116: 5235.

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Microhematuria (MH):

- Definition
  - >3 red blood cells per high-power field (RBC/HPF) on microscopic evaluation of a *single*, properly collected urine specimen[1]
- Urine dips have false positives!
  - Dehydration, exercise, hemoglobinuria, menstrual blood, myoglobinuria[2]
- Glomerular sources of MH should have nephrology evaluation (eg. red cell casts, dysmorphic RBCs)
- If MH is identified for other benign condition (eg. UTI), repeat UA should be performed upon resolution of disease process (~ 6 weeks)

1 Barocas DA, et al. Microhematuria: AUA/SUFU Guideline. J Urol. 2020 Oct;204(4):778-786.
2 *Am Fam Physician.* 2005 Mar 15;71(6):1153-1162.

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Microhematuria: Background

- Likelihood of identifying a malignancy among patients with MH is relatively low but highly dependent on risk factors[1,2]
  - Overall risk ~3%
  - Low risk patients 0.2%
  - High risk patients 11.1%
  - Gross hematuria 23 %
- Benefits and potential harms of diagnostic evaluation must be considered both at the patient and health system level.

1 Loo RK, Lieberman SF, Slezak JM et al: Stratifying risk of urinary tract malignant tumors in patients with asymptomatic microscopic hematuria. Mayo Clin Proc 2013; 88: 129.
2 Davis R, Jones JS, et al: Diagnosis, evaluation and follow-up of asymptomatic microhematuria (AMH) in adults: AUA guideline. J Urol 2012; 188: 2473.
3 Barocas DA, et al. Microhematuria: AUA/SUFU Guideline. J Urol. 2020 Oct;204(4):778-786.

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Urothelial Cancer Risk Factors

- Risk factors for stratification
  - Age
  - Male sex
  - Smoking history
  - Degree of microhematuria
  - Persistence of microhematuria
- Gross hematuria - always high risk

- Other risk factors
  - Irritative LUTS
  - Prior pelvic radiotherapy
  - Prior cyclophosphamide/ifosfamide chemotherapy
  - FH of urothelial cancer or Lynch Syndrome
  - Occupational exposures to benzene chemicals or aromatic amines (eg rubber, petrochemicals, dyes)
  - Chronic indwelling foreign body in the urinary tract

Barocas DA, et al. Microhematuria: AUA/SUFU Guideline. J Urol. 2020 Oct;204(4):778-786.

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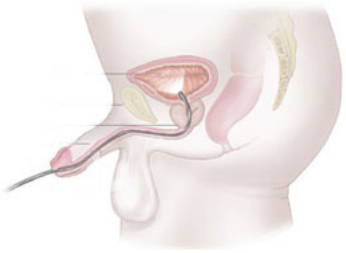
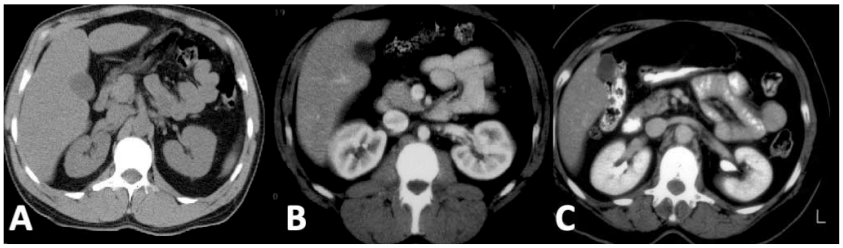
Microhematuria: Old guidelines

- Previously advised cystoscopy and CT Urogram for all patients over 35 y/o with microhematuria.





Barocas DA, et al. Microhematuria: AUA/SUFU Guideline. J Urol. 2020 Oct;204(4):778-786.
Campbell-Walsh Urology, 12 th Edition. Editors: Partin AW, Peters CA, Kavoussi LR, Dmochowski RR, Wein AJ. 2020.

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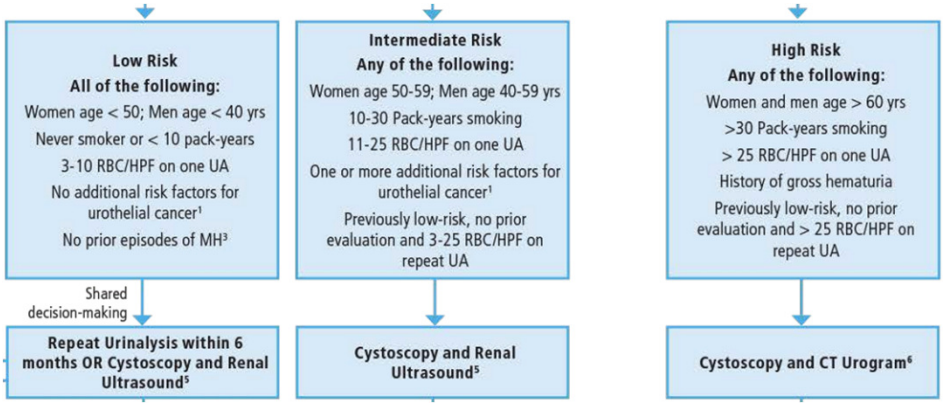
Microhematuria: Risk Stratification



Note: urine cytology and urine biomarkers not recommended

Barocas DA, et al. Microhematuria: AUA/SUFU Guideline. J Urol. 2020 Oct;204(4):778-786.

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Microhematuria:

- With this evaluation strategy, a (benign or malignant) cause for hematuria is identified in
  - 57% of patients with asymptomatic microhematuria
  - 92% of patients with gross hematuria
- Following an unrevealing work-up for hematuria:
  - Repeat UA in 1 year
  - Patients with persistent asymptomatic hematuria after a negative initial evaluation —> shared decision making about role for repeat workup

Barocas DA, et al. Microhematuria: AUA/SUFU Guideline. J Urol. 2020 Oct;204(4):778-786.

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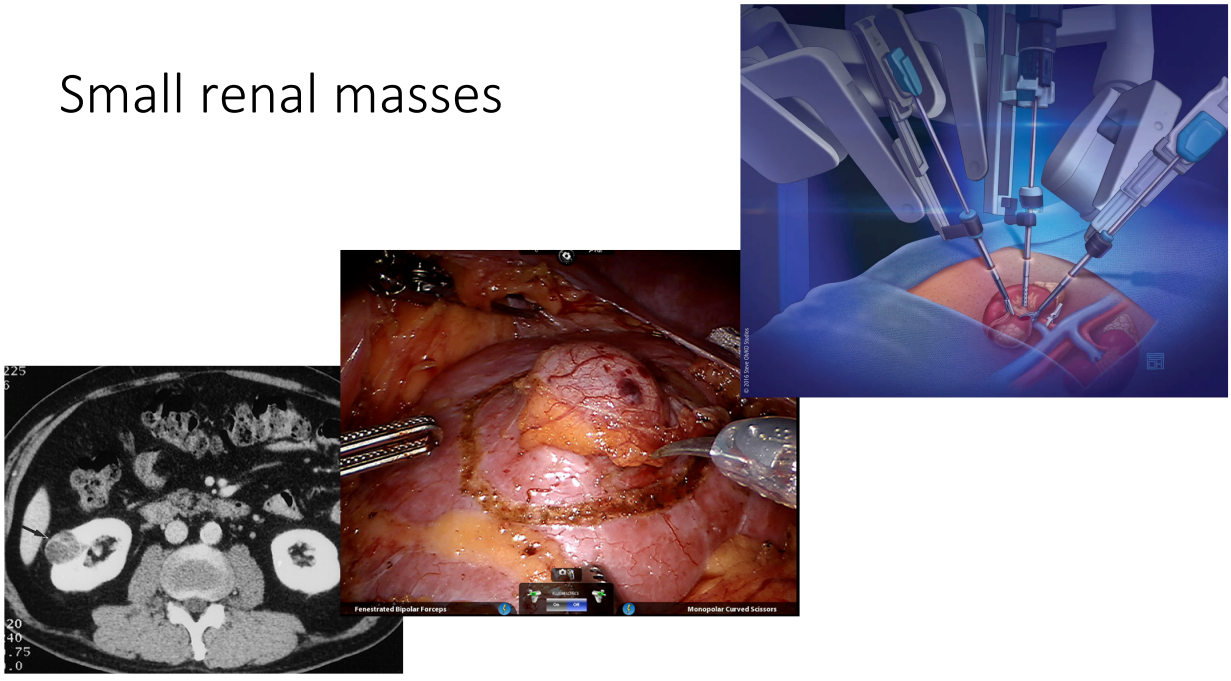
Small renal masses



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Small renal masses (SRMs)

- Relevance
  - SRMs have become important clinical issues in recent years given the increase in "incidentalomas" following growth trends in abdominal imaging.
  - 60,000 new kidney cancers were diagnosed in 2015 in the US, 40% were less than 7 cm at detection (stage I cut point).
  - Early detection of SRMs has not translated to a substantial improvement in cancer-specific survival.

1 Leone AR, Diorio GJ, et al. Contemporary Issues Surrounding Small Renal Masses: Evaluation, Diagnostic Biopsy, Nephron Sparing, and Novel Treatment Modalities. Oncology (Williston Park). 2016 Jun;30(6):507-14.

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Small renal masses (SRMs)

- Definition: Small renal mass
  - Solid, enhancing renal cortical mass or Bozniak 3 or 4 complex cysts <4 cm (cT1a)
  - Characterized by cross-sectional imaging (renal US not adequate)
- SRM statistics: [1,2,3]
  - Low rates for metastasis (<2%)
  - Slow growth: on avg (2-3 mm / year)
  - >15-45% are benign

Table 2. Risk of Metastatic Renal Cell Carcinoma (RCC) and Benign Lesion Based on Tumor Size

Tumor Size	Benign Pathology	Metastatic (M1) RCC
< 1 cm	35%–45%	< 1%
1–2 cm	20%–25%	< 1%
2–3 cm	15%–20%	< 1%
3–4 cm	15%–20%	2%
4–5 cm	10%	2%–3%
5–6 cm	10%	5%–10%
6–7 cm	5%	5%–10%
≥ 7 cm	5%	15%–20%

Adapted from Thompson et al. J Urol. 2009.[76]

1 Leone AR, Diorio GJ, et al. Contemporary Issues Surrounding Small Renal Masses: Evaluation, Diagnostic Biopsy, Nephron Sparing, and Novel Treatment Modalities. Oncology (Williston Park). 2016 Jun;30(6):507-14.
2 Active Surveillance for Localized Renal Masses: Tumor Growth, Delayed Intervention Rates, and >5-yr Clinical Outcomes. Eur Urol. 2018 Aug;74(2):157-164
3 Use of delayed intervention for small renal masses initially managed with active surveillance. Urol Oncol. 2019 Jan;37(1):18-25.

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Small renal masses

- Surgical excision may not improve overall survival for all patients with small renal masses.[1,2]
- Contemporary studies indicate that patients over the age of 75 are more likely to die of cardiovascular and other non-cancerous comorbidities than of their small renal mass.[2,3,4]
- Active surveillance is non-inferior to primary intervention based on excellent metastasis-free and cancer-specific survival.[5]

1 Leone AR, Diorio GJ, et al. Contemporary Issues Surrounding Small Renal Masses: Evaluation, Diagnostic Biopsy, Nephron Sparing, and Novel Treatment Modalities. Oncology (Williston Park). 2016 Jun;30(6):507-14.
2 Vetterlein MW, et al. Small renal masses in the elderly: Contemporary treatment approaches and comparative oncological outcomes of nonsurgical and surgical strategies. Investig Clin Urol. 2016;57(4):231-239.
3 Sun M, et al. Management of localized kidney cancer: calculating cancer-specific mortality and competing risks of death for surgery and nonsurgical management. Eur Urol. 2014;65:235–241.
4 Lane BR, et al. Active treatment of localized renal tumors may not impact overall survival in patients aged 75 years or older. *Cancer.* 2010;116:3119–3126.
5 Ray S, Cheaib JG, Pierorazio PM. Active Surveillance for Small Renal Masses. Rev Urol. 2020;22(1):9-16.

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Small renal masses

- Current society guidelines support the use of active surveillance in patients with: [1]
  - SRM <2 cm
  - SRM <4 cm in those with competing health risks

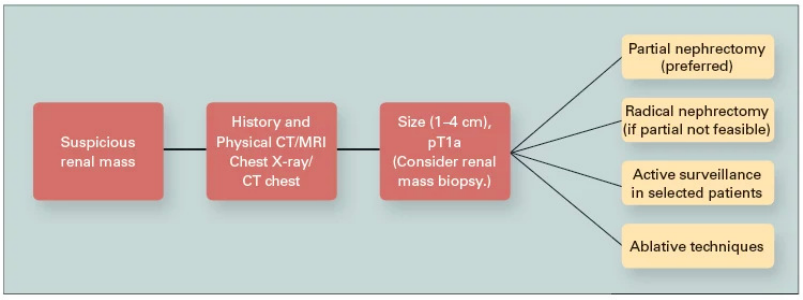

Figure 1. Workup Algorithm of Small Renal Masses. Adapted from Motzer et al. J Natl Compr Canc Netw. 2015.[13]

1 Mir MC, et al; Young Academic Urologists Kidney Cancer working group of the European Urological Association. Role of Active Surveillance for Localized Small Renal Masses. Eur Urol Oncol. 2018 Aug;1(3):177-187

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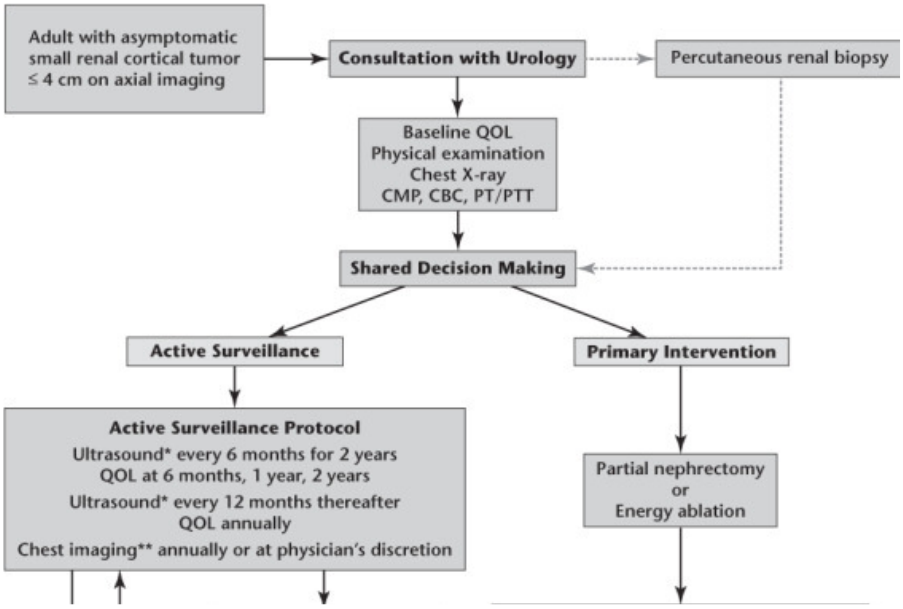
SRM Algorithm:



Ray S, Cheaib JG, Pierorazio PM. Active Surveillance for Small Renal Masses. Rev Urol. 2020;22(1):9-16.

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- American Urological Association Core Curriculum. Accessed: https://auau.auanet.org/core, 10/2021.
- European Association Guidelines on management of Non-Neurogenic male Lower Urinary Tract Symptoms (LUTS), including Benign Prostatic Obstruction (BPO). Accessed: https://uroweb.org/wp-content/uploads/EAU-Guidelines-on-Non-Neurogenic-Male-LUTS-incl.-BPO-2020.pdf, 10/2021

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- Benign prostatic hyperplasia
- Microhematuria
- Small renal masses

…Updates on common urologic problems

Q & A

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